



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION III  
1650 Arch Street  
Philadelphia, Pennsylvania 19103-2029  
4/4/2007

Ms. Cathy Curran Myers  
Deputy Secretary for Water Management  
Pennsylvania Department of Environmental Protection  
Rachel Carson State Office Building  
P.O. Box 2063  
Harrisburg, PA 17105-2063

Dear Ms. Myers:

The U.S. Environmental Protection Agency (EPA) is pleased to approve the Total Maximum Daily Load (TMDL) for the East Branch White Clay Creek Watershed as submitted to EPA for review and approval by the Pennsylvania Department of Environmental Protection (PADEP) on March 29, 2007. The TMDL was established and submitted in accordance with Sections 303(d)(1)(c) and 303(d)(2) of the Clean Water Act. The TMDL was established to address pesticide (DDT) impairments of water quality, as identified on Pennsylvania's 1996 Section 303(d) list of impaired waters still needing TMDLs.

As you know, any new or revised National Pollutant Discharge Elimination System permits with applicable effluent limits must be consistent with the TMDL's wasteload allocation pursuant to 40 CFR §122.44(d)(1)(VII)(B).

Any such permit should be submitted to EPA for review consistent with our letter dated October 1, 1998. If you have further questions, please call me or have your staff contact Mr. Thomas Henry, EPA Region III TMDL Program Manager, at (215) 814-5752.

Sincerely,

*Signed*

Jon M. Capacasa, Director  
Water Protection Division

Enclosure

cc: Mr. Glenn Rider, PADEP  
Mr. Bill Brown, PADEP  
Mr. Jenifer Fields, PADEP SERO  
Mr. Desiree Henning-Dudley, PADEP SERO



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**Decision Rationale  
Total Maximum Daily Loads  
East Branch White Clay Creek Watershed  
For Pesticides Affected Segments  
Chester County, Pennsylvania**

*Signed*

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**Jon M. Capacasa, Director  
Water Protection Division**

**Date: 4/4/2007**

**Decision Rationale**  
**Total Maximum Daily Loads**  
**East Branch White Clay Creek**  
**Pesticides (DDT)**

## **I. Introduction**

The Clean Water Act (CWA) requires that Total Maximum Daily Loads (TMDLs) be developed for those waterbodies identified as impaired by the state where technology-based and other controls will not provide for attainment of water quality standards. A TMDL is a determination of the amount of a pollutant from point, nonpoint, and natural background sources, including a margin of safety (MOS) that may be discharged to a waterbody without exceeding water quality standards.

The Pennsylvania Department of Environmental Protection (PADEP) Bureau of Watershed Management electronically submitted the East Branch White Clay Creek TMDL (TMDL Report) to the U.S. Environmental Protection Agency (EPA) for final Agency review and was received on March 29, 2007. This report includes a TMDL for pesticides (4,4-DDT) and addresses one segment on Pennsylvania's 1996 Section 303(d) list of impaired waters.

EPA's rationale is based on the TMDL Report and information contained in the attachments to the report. EPA's review determined that the TMDL meets the following eight regulatory requirements pursuant to 40 CFR Part 130:

1. The TMDL is designed to implement the applicable water quality standards.
2. The TMDL includes a total allowable load as well as individual wasteload allocations (WLAs) and load allocations (LAs).
3. The TMDL considers the impacts of background pollutant contributions.
4. The TMDL considers critical environmental conditions.
5. The TMDL considers seasonal environmental variations.
6. The TMDL includes a MOS.
7. There is reasonable assurance that the proposed TMDL can be met.
8. The TMDL has been subject to public participation.

## **II. Background**

PADEP identified East Branch White Clay Creek on Pennsylvania's 1996 303(d) List of Impaired Waters for aquatic life use impairments due to pesticides. This listing resulted from periodic excursions of various pesticide levels from a Water Quality Network sampling station in the early 1990s. Despite the mushroom industry's reduction in pesticide usage in the area, the White Clay Watershed Association documented a depressed aquatic community, and this led to a PADEP survey of the watershed in 1997. DDT was found to be the only pesticide exceeding water column criteria. As such, the TMDL Report addresses high levels of DDT in East Branch White Clay Creek above the Avondale Tributary.

As described in the TMDL Report, DDT was used by agricultural producers as a

pesticide in the 1950s and 1960s. However, due to DDT's long half-life and its adverse affects on reproduction of wildlife species, the use of DDT was prohibited in the United States in 1973 and its production has ceased.

Within the East Branch White Clay Creek basin, around the Borough of Avondale, the most likely source of pesticides is the mushroom industry. Mushroom growing facilities are located all around Avondale, and spent mushroom compost has been spread on much of the surrounding terrain throughout the watershed. The TMDL Report notes that a mushroom growing cycle takes approximately 10 to 15 weeks to complete. At the end of each cycle, old compost must be disposed of before new compost is created, and each new batch of compost must be sanitized. Historically, pesticides had been used as part of the sanitation process; now most compost is steam pasteurized. Pesticides also had been used to control flies, bacteria, and fungi that attacked the mushroom spawn. Although use by the mushroom industry has decreased greatly in recent years, persistent organochloride compounds have leached from old, spent compost that had been spread in the past.

Table 1 presents the 1996, 1998, 2002, and 2004 Section 303(d) listing information for the impaired segment first listed in 1996.<sup>1</sup>

**TABLE 1. SECTION 303(D) LISTINGS FOR EAST BRANCH WHITE CLAY CREEK, PENNSYLVANIA**

STATE WATER PLAN (SWP) SUBBASIN 03-I						
Year	Segment ID	Stream Code	Stream Name	Miles	Source	Cause
1996		00432	East Branch White Clay Creek	2	Other Nonpoint Sources	Pesticides
1998	Not identified on 1998 Section 303(d) List					
2002	9417		East Branch White Clay Creek	1.9	Source Unknown	Pesticides
2002	9417	00432	East Branch White Clay Creek	1.9	Source Unknown	Pesticides

East Branch White Clay Creek was identified on Pennsylvania's 1996 Section 303(d) list of impaired waters and counts toward the tenth year (2007) non-mining TMDL milestone commitment under the requirements of the 1997 TMDL lawsuit settlement agreement.

TMDLs are defined as the summation of the point source WLAs, plus the summation of the nonpoint source LAs, plus a MOS and are often shown as follows:

$$\text{TMDL} = \sum \text{WLAs} + \sum \text{LAs} + \text{MOS}$$

<sup>1</sup> Pennsylvania's 1996, 1998, 2002, and 2004 Section 303(d) lists were approved by the Environmental Protection Agency (EPA). The 1996 Section 303(d) list provides the basis for measuring progress under the 1997 lawsuit settlement of *American Littoral Society and Public Interest Research Group of Pennsylvania v. EPA*.

The TMDL is a written plan and analysis established to ensure that a waterbody will attain and maintain applicable water quality standards. The TMDL is a scientifically-based strategy which considers current and foreseeable conditions, utilizes the best available data, and accounts for uncertainty with the inclusion of a MOS value. Since conditions, available data, and the understanding of natural processes can change more than anticipated by the MOS, there exists the option of refining the TMDL for resubmittal to EPA.

### III. Discussions of Regulatory Requirements

EPA has determined that these TMDLs are consistent with statutory and regulatory requirements and EPA policy and guidance.

#### 1. *The TMDL is designed to implement the applicable water quality standards.*

Water quality standards are state regulations that define the water quality goals of a waterbody. Standards are comprised of three components: (1) designated uses; (2) criteria necessary to protect those uses, and (3) antidegradation provisions that prevent the degradation of water quality. Table 2 includes the human health and chronic fish and aquatic life use criteria that apply to the waterbody, and the *TMDL Development* Section of the TMDL Report discusses the regulatory specifications of these criteria. EPA finds that the TMDL will attain and maintain the applicable numeric water quality standard.

**TABLE 2. APPLICABLE WATER QUALITY CRITERION\***

<b>4, 4-DDT Criterion</b>	<b>Criterion Value (mg/l)</b>	<b>Flow Specification</b>
Human Health	0.00000059	Harmonic Mean Flow
Fish and Aquatic Life – Chronic Criterion (CCC)	0.000001	Q <sub>7-10</sub>

\*Pennsylvania's criteria for 4,4-DDT can be found at 25 PA. Code §16.102

#### 2. *The TMDL includes a total allowable load as well as individual WLAs and LAs.*

In determining the total allowable load for East Branch White Clay Creek, PADEP first evaluated whether to use the human health or fish and aquatic life chronic criteria. It is important to mention that Pennsylvania regulations specify the flow at which each criterion is applied. For the human health criterion, Pa. Code, Title 25, Chapter 16 specifies a harmonic mean flow; and for the Criteria Continuous Concentration (CCC) for the protection of fish and aquatic life use, 25 Pa. Code, Title 25 §96.4 specifies a design flow condition of Q<sub>7-10</sub>, which Pennsylvania defines as the lowest average flow that is experienced for seven continuous days with a recurrence interval of ten years. Applying these flows, PADEP calculated the total allowable load using each criterion. The more stringent target load, the CCC value, was used as the total allowable load, which PADEP establishes as a daily load.

Since the production and use of DDT has ceased and because there are no point sources

of DDT within the watershed, PADEP assigned the entire allowable load to the LA portion of the TMDL, and the WLA is 0.

Table 3 summarizes the elements of the TMDL as determined by PADEP. EPA finds the total allowable load, WLA and LA all to be acceptable.

**TABLE 3. DDT TMDL SUMMARY FOR EAST BRANCH WHITE CLAY CREEK**

<b>Existing Load (lbs/day)</b>	<b>TMDL (lbs/day)</b>	<b>WLA (lbs/day)</b>	<b>LA (lbs/day)</b>	<b>MOS (lbs/day)</b>	<b>Percent Reduction</b>
$1.46 \times 10^{-4}$	$9.76 \times 10^{-6}$	0	$9.76 \times 10^{-6}$	Implicit	93.3%

*3. The TMDL considers the impacts of background pollutant contributions.*

PADEP explains that the source of DDT in the watershed originates from historic applications to mushroom spawns for the control of insects and sanitization of mushroom compost. Because of their past heavy and widespread use, strong affinities for sorption to sediment organic matter and tissue, and slow rates of decomposition, DDT and/or their degradation products frequently remain at elevated levels in the environment for many years after widespread use has ended.

*4. The TMDL considers critical environmental conditions.*

The reductions specified in the TMDL apply at all flow conditions. PADEP's use of the  $Q_{7-10}$  flow to derive the total allowable load considers critical conditions.

*5. The TMDL considers seasonal environmental variations.*

The total allowable load and allocations specified in the TMDL apply at all flow conditions and all seasons.

*6. The TMDL includes a MOS.*

PADEP expressed the MOS implicitly by using the more stringent chronic criterion for DDT over the human health criterion. Additionally, the total allowable load was derived from the  $Q_{7-10}$  flow although the stated allocations apply at all flow conditions.

*7. There is reasonable assurance that the proposed TMDL can be met.*

As TMDLs represent an attempt to quantify the pollutant load that may be present in a waterbody and still ensure attainment and maintenance of water quality standards, the East Branch White Clay Creek TMDL identifies the necessary pesticide (DDT) load reductions necessary to meet the water quality objectives for pesticides in this waterbody and distributes those reduction goals to the appropriate sources. The *Reasonable Assurance and Other Relevant Information* Section of the TMDL Report explains that the attainment of these targets and allocations are expected to result in attainment of the narrative objectives for pesticides. Hence,

such attainment should also protect the freshwater habitat and wildlife habitat beneficial uses in this watershed, and indirectly protect human health in the case of DDT. PADEP states that the reduction of these pesticides loads in surface water will be achieved through application controls and other best management practices (BMPs) designed to reduce the transport of pesticides to surface waters.

The TMDL accounts for the historic use of pesticides and the widespread application of pesticide-laden compost throughout the watershed. Bans on the use of DDT have resulted in a slow but steady decline in environmental residues, and PADEP indicates that continuing decreases in the environmental levels of these pesticides is expected via degradation and metabolism of the contaminants and burial of contaminated sediment through natural sedimentation. This is the preferred mechanism for removal of these pesticides from the environment, although the TMDL Report also lists alternative approaches.

Due to the limited amount of data to support the 1996 pesticides listing of East Branch White Clay Creek, PADEP anticipates additional data collection. The data will be analyzed to determine if the TMDL has resulted in the attainment of water quality standards, or whether additional controls are necessary.

The TMDL Report notes the various controls, production upgrades, and BMPs installed by the Hy Tech Compost and Mushroom Farm, a fresh compost and mushroom growing operation located right next to the Avondale Sewage Treatment Plant and a tributary to the White Clay Creek. The Hy Tech Compost and Mushroom Farm has been a co-operator with the Chester County Conservation District since the early 1980s. The Needham Family and Hy Tech managers have been early supporters of the Chester County Conservation District's efforts to secure funding for the PL83-566 Land Treatment Program for the Red and White Clay Creeks Watersheds.

*8. The TMDLs have been subject to public participation.*

Public notice of the draft TMDL was published in the *Pennsylvania Bulletin* to foster public comment on the calculated allowable loads. A public comment period of 30 days was provided to the public. No comments were received by PADEP.

Although not specifically stated in the TMDL Report, PADEP routinely posts the approved TMDL Reports on their web site: [www.dep.state.pa.us/watermanagement\\_apps/tmdl/](http://www.dep.state.pa.us/watermanagement_apps/tmdl/).